Pigeon Life (pigeon)

Welcome to your new life as a pigeon!

Today is a wonderful day with T minutes of daylight. You start your new routine at time $t = 0$ from the centre of the town square at coordinates $(0, 0)$. There are many people in the square, N of which spend their whole day feeding pigeons (a.k.a. your servants).

The i-th servant is stationed at point (x_i, y_i) and will throw breadcrumbs at pigeons which are within a Manhattan distance of d_i or, formally: you will receive a breadcrumb if you are at a position (x, y) such that $|x - x_i| + |y - y_i| \leq d_i$. Note that there can be more than one person at the same coordinates and you may receive more than one breadcrumb from different people at the same time.

Figure 1: ~~Goat~~ Pigeon Simulator.

Choosing the best path for the day is a tough task, but your pigeon brain innately knows an incredibly complex algorithm to maximize your daily intake, which is the result of thousands of years of evolution.

The algorithm works as follows: at each minute $t \geq 1$ you will randomly move North, East, South or West by one unit from your position at time $t - 1$, with each of the four directions being chosen with equal probability (staying still is evolutionarily disadvantageous).

While your previous human brain may not fully understand the perfection of such an algorithm, it can still be useful in other ways: you could use it to write an algorithm to compute, for each t from 0 to T, the expected number of breadcrumbs you will receive at time t. Because the result may be very large, you are required to only print its remainder after dividing it by 1 000 000 007.

Input

The first line contains two integers: N and T, the number of servants and the length of the day.

Each of the following N lines contains three integers: x_i, y_i and d_i, the coordinates and the maximum feeding distance of the i-th servant.

Output

You need to output $T + 1$ lines. It can be shown that the answer for time t can be expressed as a fraction $\frac{x_t}{4^t}$. The $(t + 1)$-th line should contain $x_t \mod 1\,000\,000\,007$.

Constraints

- $1 \leq N \leq 100$.
- $1 \leq T \leq 10^5$.
- $-10^6 \leq x_i, y_i \leq 10^6$ for every i.
- $0 \leq d_i \leq 10^6$ for every i.

Examples

input	output
2 2 2 0 2 1 1 1	1 3 11

Explanation

At time $t = 0$ you are at position $(0, 0)$ with probability 1, and you will receive 1 breadcrumb from the first servant. The answer is $\frac{1}{4^0}$.

At time $t = 1$ you will be:

- at position $(0, 1)$ with probability $\frac{1}{4}$, from which you will receive 1 breadcrumb from the second servant;
- at position $(1, 0)$ with probability $\frac{1}{4}$, from which you will receive 2 breadcrumbs from both servants;
- at position $(0, -1)$ or $(-1, 0)$ with probability $\frac{1}{4}$ each, from which you will receive 0 breadcrumbs.

The answer is $\frac{3}{4^1}$.

At time $t = 2$ you will be:

- at position $(0, 0)$ with probability $\frac{4}{16}$, from which you will receive 1 breadcrumb from the first servant;
- at position $(1, 1)$ with probability $\frac{2}{16}$, from which you will receive 2 breadcrumbs from both servants;
- at position $(1, -1)$ with probability $\frac{2}{16}$, from which you will receive 1 breadcrumb from the first servant;
- at position $(0, 0)$ with probability $\frac{1}{16}$, from which you will receive 1 breadcrumb from the first servant;
- at position $(-1, -1)$ or $(-1, 1)$ with probability $\frac{2}{16}$ each, from which you will receive 0 breadcrumbs;
- at position $(0, 2)$, $(0, -2)$ or $(-2, 0)$ with probability $\frac{1}{16}$ each, from which you will receive 0 breadcrumbs.

The answer is $\frac{11}{4^2}$.